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Attorney Docket No. : 20496-248

IN THE UNITED STATES PATENT & TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

Group Art Unit: 1742
Examiner: Janell A. Combs-Morillo

Applicant	:	Rolf BODE, et al.
Serial No.	:	09/508,490
Filing Date	:	March 10, 2000
Title	:	PROCESS FOR THE PRODUCTION ~~OF STOVE-FINISHED~~ STRUCTURAL COMPONENTS FROM AGEING-SENSITIVE STEEL

SUPPLEMENTAL APPEAL BRIEF

I hereby certify that this paper is being deposited this date with the U.S. Postal Service as first class mail addressed to the Assistant Commissioner for Patents, Washington, D.C. 20231.

SILVIA SALVADORI
Name of person signing the certification

Silvia Salvadori March 19, 2003
Signature Date

Assistant Commissioner for Patents
Washington, DC 20231

Sir:

In view of the non-final Office Action dated September 19, 2002, which reopened prosecution of this application subsequent to applicants having appealed the Final Office Action dated October 18, 2001, and applicants having filed an Appeal Brief on or about May 1, 2002, applicants submit this Supplemental Appeal Brief. This Supplemental Appeal Brief only addresses the new issues raised in the non-final Office Action of

September 19, 2002, and otherwise incorporates by reference the previously filed Appeal Brief.

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There are no other appeals or interferences known to appellants, the appellants' legal representative, or the assignee which will directly affect, or be directly affected by, or have a bearing on the Board's decision in the pending appeal.

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Claims 1-5 are pending in the present application.

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The present invention is a process for producing a buckling-resistant stove-finished structural component from a cold strip of ageing-sensitive steel with a high bake-hardening potential. According to one embodiment of the invention, the cold strip is converted by temper rolling to a yield point elongation-free state in which the condition $R_{eh} - R_{el} < 2$ N/mm^2 is met. The cold strip is then stored at a storage temperature below room temperature for a storage period whose length is at most equal to the length of the period at whose end the value of critical ageing is reached which results in dependence on the particular storage temperature. This low-temperature storage enables the producer to store the steel strip much longer than under the storage conditions normally used for ageing-sensitive steel. Subsequently, the cold strip is cold worked to produce a structural component and the structural component is stove-finished. The stove-finishing uses the

high-bake hardening potential of the inventive steel to produce strengthened and buckling-resistant components.

According to an alternative embodiment of the invention, the cold strip is first stored for a storage period at room temperature. After the storage period, the cold strip is converted by temper rolling to a state in which the condition $R_{eh} - R_{el} < 2$ N/mm^2 is met. The temper rolled cold strip is then cold worked to produce a structural component and the structural component is stove-finished.

VI. ISSUES PRESENTED FOR REVIEW

1) Whether the Examiner's rejection of claims 1-5 under 35 U.S.C. 112, second paragraph, for failing to further clarify the definition of "ageing sensitive steel" should be reversed.

2) Whether the Examiner's rejection of claims 1-5 under 35 U.S.C. 103(a) as being obvious over Nakaoka et al. (U.S. Patent 4,323,403) alone or in view of "ASM Handbook: Vol. 1 Properties and Selection: Irons, Steels, and High-Performance Alloys" or "The Making, Shaping and Treating of Steel" should be reversed.

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Claims 1, 2, and 4 stand and fall separately from claims 3 and 5 as the Examiner has provided different reasons for rejecting them under 35 U.S.C. 103(a) as the limitations of the two sets of claims differ.

VIII. ARGUMENT

ISSUE #1

Claims 1-5 were rejected under 35 U.S.C. 112, second paragraph, for lack of clarity of the term "ageing sensitive steel" which is used in independent claims 1 and 3.

As noted by the Examiner, this term is explained on page 1 of the specification. Moreover, as shown in the "ASM Handbook: Vol. 1 Properties and Selection: Irons, Steels, and High-Performance Alloys" and in "The Making, Shaping and Treating of Steel," "ageing" is a commonly known phenomenon know in the art to which the present invention pertains. Specifically, "ageing" refers to a phenomenon which occurs in carbon steels as the result of diffusion of dissolved substances, for example, dissolved carbon or nitrogen. Ageing causes a significant change of properties, which as a rule leads to a decrease of press formability. A person skilled in the art will understand that an "ageing sensitive" steel is one which tends to age as the result of the diffusion of the dissolved substances included in its structure.

These effects have already been explained on pages 1 and 2 of the instant application. Therefore, the rejection because of lack clarity of the term "ageing sensitive" as used in the claims is unjustified.

ISSUE #2

Claims 1, 2 and 4 were rejected under 35 U.S.C. 103(a) as being obvious over Nakaoka et al. ((US Patent No. 4,050,959) alone or in view of "ASM Handbook: Vol. 1 Properties and Selection: Irons, Steels, and High-Performance Alloys" or "The Making, Shaping and Treating of Steel." Separately, claims 3 and 5 were rejected under 35 U.S.C. 103(a) as being obvious from the same prior art, different reasons being given because the limitations of claims 3 and 5 differ from those of claims 1, 2 and 4.

In the Office Action of September 19, 2002, the Examiner referred to the teaching of Nakaoka as "a process for the production of steel sheets with good press formability comprising the steps of: providing an ageing sensitive steel, subjecting said steel to temper rolling in order to achieve a yield point elongation = 0, ageing so that the yield point elongation amount < 1.2 %, wherein said steel sheet usable for drawing purposes such as press forming." This is a wrong and incomplete interpretation of the essence of the teaching of Nakaoka.

The steel sheets produced according to the teaching of Nakaoka are not ageing-sensitive, as they are characterized by having a high ageing resistance (column 1, lines 15-20). Accordingly, the strategy for achieving such products is to modify the commonly known continuous annealing process in such a way that the steel sheet sustains its press formability during the generally 2 to 3 months between manufacture and consumption.

Thus, the annealing method of Nakaoka is designed to impart to the steel sheet a high work hardening index, a low yield point, and a low yield point elongation, in particularly in such a way that said period may be overcome with the least possible

deterioration of the material. Therefore, the disclosure of Nakaoka focuses in the production of a steel of good work-hardenability. Nakaoka does not teach the possibility of producing a steel with a high bake-hardening potential.

The method disclosed in Nakaoka aims at producing a temper rolled steel sheet to be eventually put into storage. It is only to measure the achieved degree of ageing-resistance that specimen of the product has been exposed to an accelerated ageing at 38^0 C for 8 days. These artificial ageing conditions correspond to the above mentioned 2 months at room temperature.

Except for claiming a higher coiling temperature preferably at about 680^0 C (690^0 C), Nakaoka premises no further limits on the methods for slab production or hot rolling and cold rolling themselves. As far as materials are concerned, the method of Nakaoka is restricted to low carbon, rimmed steel, low carbon Al-killed steel and low carbon Si-killed steel. However, no further specific restrictions exist on reduced C, Mn, S, P and O_2 contents or varied correlation between them. At the same time, Nakaoka emphasizes the high significance of a proper control of the first and second step of his annealing method. In this respect, Nakaoka names the second step as the most crucial requirement to the quality of the strip in the heating cycle. Accordingly, after making the steel in accordance with ordinary steel making process, including the raised coiling temperature, the subsequent, well controlled heating and cooling sequence leads to a product comparable to one batch annealed.

Thus, the teaching of Nakaoka focuses on the continuous annealing process well embedded between the hot rolling and coiling steps with its raised coiling temperature, and the subsequent cold rolling and temper rolling steps of which it claims, that the yields

point elongation of 0 has to be adjusted before the thus manufactured age-resistant sheet metal may wait for consumption. The products made using the method disclosed in Nakaoka have good press formability, indicated by a high work hardening index, and a superior ageing resistance.

In contrast to that, the present invention teaches a method for the production of structural components made of an ageing-sensitive steel with a high bake-hardening potential after being cold formed. These structural components obtain their final hardness during the stove-finishing of the product only after being cold formed.

Claims 1 and 3 recite respectively:

1. "A process for the production of a buckling resistant stove-finished structural component **from a cold strip** which comprises **ageing-sensitive steel with a high bake hardening potential....**

...storing the cold strip at storage temperature below room temperature...

...cold working the cold strip to give a structural component, and

stove-finishing the structural component."

3. "A process for the production of a buckling-resistant stove-finished structural component **from a cold strip** which comprises **ageing-sensitive steel with a high bake-hardening potential....**

..storing the cold strip undressed for a storage period at room temperature..

...cold working the temper rolled cold strip to give structural component, and

stove-finishing the structural component."

Thus, according to the present invention, the hardness of the product is **not** achieved **during** the cold forming of the steel sheet, as it is in the case of a work-hardening steel produced according to Nakaoka, but **after** the cold forming, in an additional heating step which is performed to stove enameling a lacquer applied to the surface of the cold formed product.

Thus, the bake hardening potential in combination with the age-sensitiveness is an essential element of the inventive method. By utilizing a high bake hardening potential of steels age-sensitive at room temperature, it is possible to produce structural components which have higher buckling resistance in comparison with bake-hardening steels resistant to ageing at room temperature. This effect cannot be achieved with the steels processed according to the method disclosed in Nakaoka, because these steels are already in a hardened state after the cold forming step.

Nakaoka only reaches the quality of its product with a system of restrictions on the alloy of the steels used, on the annealing process, on the coiling, and on temper rolling. Accordingly, the scope of the teaching of Nakaoka covers the production steps from coiling to temper rolling to achieve a product which is free from the problem of age-sensitivity.

This is not the idea of the present invention. The invention teaches to process an age-sensitive steel having a high bake hardening potential without any restrictions on the annealing or coiling steps performed during the production of the steel. According to the invention, the steel sheets are processed in an age-sensitive state. After having entered the inventive process, these sheets are processed in a way that, although they are age-sensitive, permits their storage between their delivery for the steel producing plant and

the cold forming and subsequent bake-hardening. Thus, the inventive method starts at a stage of the production of a cold formed steel product which is never reached during the method disclosed by Nakaoka. This is because, according to Nakaoka, the steel has a superior ageing resistance at the end of the known production process, so that the storage and subsequent processing of this steel is uncritical. In addition, the steel produced according to the teaching of Nakaoka is not bake-hardenable, thus it is not characterized by the superior formability of a bake-hardenable steel.

The "ASM Handbook" and the "The Making, Shaping and Treating of Steel" only confirm the explanation of the technical background already included in the introduction of the patent application. A man skilled in the art knew, when the invention was developed, that the phenomenon of ageing of steel was caused by the diffusion of dissolved alloying elements in relation to the age of the steel. In addition, a skilled artisan knew before the priority date of the present application that some sort of steels could be hardened by a heat treatment carried out in an enameling step. But, even considering this knowledge, at the time of the priority date of the presently claimed invention a man skilled in the art could not have reached the conclusion that it was possible to store for a certain amount of time a bake-hardenable and age-sensitive steel after delivery in order to cold form such steel after storage and to subsequently bake harden the cold formed product made from the steel without the danger of losing the steel's properties as result of ageing.

Instead, as proven by the teaching of Nakaoka, the skilled artisan tried to establish methods of producing age-resistant steels characterized by a good formability and a good work-hardenability. Thus, the known art offers possibilities of avoiding the problem of

ageing, but the price for these solutions is a loss of the superior press formability of bake-hardenable steels of the kind processed according to the present invention.

In conclusion, Nakaoka teaches that at the priority date of the present application a man skilled in the art tried to produce age-resistant steels with good press formability and good work-hardenability. Due to this work-hardenability in combination with the good press formability the know ageing-resistant steels could be cold formed into products which after cold forming have a high toughness. The toughness of the product is achieved by the hardening of the steel as the result of the cold forming. Enameling the product made from the steel produced according to the process disclosed in Nakaoka will not lead to an increased hardness of the product, because the steels processed according to Nakaoka do not have bake-hardening properties.

On the contrary, the presently claimed invention teaches a process with age-sensitive steels with high bake-hardening potential as claimed in claims 1 and 3. These steels do not receive their hardness during cold forming but only during a subsequent heat treatment, which is performed to stove-finish the lacquering applied on the surface of the cold formed

For all of the above reasons, not only the process steps of claims 1, 2 and 4, but also the products of the inventive method as claimed in claims 3 and 5 are different from the method disclosed in Nakaoka.

Thus, the cited prior art, alone or in combination, fails to teach or suggest all the claim limitations as properly required for establishing a *prima facie* case of obviousness. It would therefore not have been obvious for a person skilled in the art at the time of the invention to modify the teachings of Nakaoka to arrive at the presently claimed invention.

Accordingly, a reversal of the rejection of claims 1-5 under 35 U.S.C. 103(a) is respectfully requested.

IX. CONCLUSION

It is respectfully submitted that claims 1 and 3-5, as amended in the Supplemental Amendment after Final Action under 37 C.F.R. 1.116(b), and claim 2 overcome the rejection under 35 U.S.C. 112, second paragraph. It is therefore requested that the rejection under 35 U.S.C. 112, second paragraphs, of claims 1-5 be reversed.

In addition, for the reasons set forth above, it is submitted that claim 1 is not rendered unpatentable by the prior art of record. Furthermore, as claims 2 and 4 depend from claim 1, it is submitted that they too are not rendered unpatentable by the prior art of record.

Also for the reasons set forth above, it is submitted that claim 3 is not rendered unpatentable by the prior art of record, regardless of the patentability of claim 1. Furthermore, as claim 5 depends from claim 3, it is submitted that it too is not rendered unpatentable by the prior art of record.

It is requested that the rejections under 35 U.S.C. 103(a) of claims 1-5 be reversed.

The Commissioner is also hereby authorized to charge a three month Extension of Time Fee from Deposit Account No. 16-2500 of the undersigned.

Respectfully submitted,
PROSKAUER ROSE LLP
Attorneys for Applicant(s)

Date: March 19, 2003

By: _____
Charles Guttman
Reg. No. 29,161

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New York, N.Y. 10036
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Enclosure: Appendix of Claims in Appeal

#15

X. APPENDIX

--1. A process for the production of a buckling resistant stove-finished structural component from a cold strip which comprises ageing-sensitive steel with a high bake-hardening potential, comprising the steps of:

- converting the cold strip by temper rolling to a yield point elongation-free state in which the condition $R_{eh} - R_{el} < 2$ N/mm^2 is met,
- storing the cold strip at storage temperature below room temperature for a storage period whose length is at most equal to the length of the period at whose end the value of critical ageing is reached which results in dependence on the particular storage temperature,
- cold working the cold strip to give a structural component, and
- stove-finishing the structural component.

2. A process according to claim 1, characterized in that the storage temperature T in [K] of the cold strip is selected in dependence on the planned storage time t in [h] in accordance with the equation

$$T = 9225 / (31.48 - 1n (48/t))$$

with T: storage temperature in [K]

T: storage time in [h].

3. A process for the production of a buckling-resistant stove-finished structural component from a cold strip which comprises ageing-sensitive steel with a high bake-hardening potential, comprising the steps of:

- storing the cold strip undressed for a storage period at room temperature,
- converting the cold strip by temper rolling to a state in which the condition $R_{eh} - R_{el} < 2$ N/mm^2 is met,
- cold working the temper rolled cold strip to give a structural component, and
- stove-finishing the structural component.

4. The process according to claim 1 wherein said bake-hardening potential is at least 70 N/mm^2.

5. The process according to claim 3 wherein said bake-hardening potential is at least 70 N/mm^2.--

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high-bake hardening potential of the inventive steel to produce strengthened and buckling-resistant components.

According to an alternative embodiment of the invention, the cold strip is first stored for a storage period at room temperature. After the storage period, the cold strip is converted by temper rolling to a state in which the condition $R_{eh} - R_{el} < 2$ N/mm^2 is met. The temper rolled cold strip is then cold worked to produce a structural component and the structural component is stove-finished.

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Thus, the annealing method of Nakaoka is designed to impart to the steel sheet a high work hardening index, a low yield point, and a low yield point elongation, in particularly in such a way that said period may be overcome with the least possible

deterioration of the material. Therefore, the disclosure of Nakaoka focuses in the production of a steel of good work-hardenability. Nakaoka does not teach the possibility of producing a steel with a high bake-hardening potential.

The method disclosed in Nakaoka aims at producing a temper rolled steel sheet to be eventually put into storage. It is only to measure the achieved degree of ageing-resistance that specimen of the product has been exposed to an accelerated ageing at 38^0 C for 8 days. These artificial ageing conditions correspond to the above mentioned 2 months at room temperature.

Except for claiming a higher coiling temperature preferably at about 680^0 C (690^0 C), Nakaoka premises no further limits on the methods for slab production or hot rolling and cold rolling themselves. As far as materials are concerned, the method of Nakaoka is restricted to low carbon, rimmed steel, low carbon Al-killed steel and low carbon Si-killed steel. However, no further specific restrictions exist on reduced C, Mn, S, P and O_2 contents or varied correlation between them. At the same time, Nakaoka emphasizes the high significance of a proper control of the first and second step of his annealing method. In this respect, Nakaoka names the second step as the most crucial requirement to the quality of the strip in the heating cycle. Accordingly, after making the steel in accordance with ordinary steel making process, including the raised coiling temperature, the subsequent, well controlled heating and cooling sequence leads to a product comparable to one batch annealed.

Thus, the teaching of Nakaoka focuses on the continuous annealing process well embedded between the hot rolling and coiling steps with its raised coiling temperature, and the subsequent cold rolling and temper rolling steps of which it claims, that the yields

point elongation of 0 has to be adjusted before the thus manufactured age-resistant sheet metal may wait for consumption. The products made using the method disclosed in Nakaoka have good press formability, indicated by a high work hardening index, and a superior ageing resistance.

In contrast to that, the present invention teaches a method for the production of structural components made of an ageing-sensitive steel with a high bake-hardening potential after being cold formed. These structural components obtain their final hardness during the stove-finishing of the product only after being cold formed.

Claims 1 and 3 recite respectively:

1. "A process for the production of a buckling resistant stove-finished structural component **from a cold strip** which comprises **ageing-sensitive steel with a high bake hardening potential....**

...storing the cold strip at storage temperature below room temperature...

...cold working the cold strip to give a structural component, and

stove-finishing the structural component."

3. "A process for the production of a buckling-resistant stove-finished structural component **from a cold strip** which comprises **ageing-sensitive steel with a high bake-hardening potential....**

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...cold working the temper rolled cold strip to give structural component, and

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Thus, according to the present invention, the hardness of the product is **not** achieved **during** the cold forming of the steel sheet, as it is in the case of a work-hardening steel produced according to Nakaoka, but **after** the cold forming, in an additional heating step which is performed to stove enameling a lacquer applied to the surface of the cold formed product.

Thus, the bake hardening potential in combination with the age-sensitiveness is an essential element of the inventive method. By utilizing a high bake hardening potential of steels age-sensitive at room temperature, it is possible to produce structural components which have higher buckling resistance in comparison with bake-hardening steels resistant to ageing at room temperature. This effect cannot be achieved with the steels processed according to the method disclosed in Nakaoka, because these steels are already in a hardened state after the cold forming step.

Nakaoka only reaches the quality of its product with a system of restrictions on the alloy of the steels used, on the annealing process, on the coiling, and on temper rolling. Accordingly, the scope of the teaching of Nakaoka covers the production steps from coiling to temper rolling to achieve a product which is free from the problem of age-sensitivity.

This is not the idea of the present invention. The invention teaches to process an age-sensitive steel having a high bake hardening potential without any restrictions on the annealing or coiling steps performed during the production of the steel. According to the invention, the steel sheets are processed in an age-sensitive state. After having entered the inventive process, these sheets are processed in a way that, although they are age-sensitive, permits their storage between their delivery for the steel producing plant and

the cold forming and subsequent bake-hardening. Thus, the inventive method starts at a stage of the production of a cold formed steel product which is never reached during the method disclosed by Nakaoka. This is because, according to Nakaoka, the steel has a superior ageing resistance at the end of the known production process, so that the storage and subsequent processing of this steel is uncritical. In addition, the steel produced according to the teaching of Nakaoka is not bake-hardenable, thus it is not characterized by the superior formability of a bake-hardenable steel.

The "ASM Handbook" and the "The Making, Shaping and Treating of Steel" only confirm the explanation of the technical background already included in the introduction of the patent application. A man skilled in the art knew, when the invention was developed, that the phenomenon of ageing of steel was caused by the diffusion of dissolved alloying elements in relation to the age of the steel. In addition, a skilled artisan knew before the priority date of the present application that some sort of steels could be hardened by a heat treatment carried out in an enameling step. But, even considering this knowledge, at the time of the priority date of the presently claimed invention a man skilled in the art could not have reached the conclusion that it was possible to store for a certain amount of time a bake-hardenable and age-sensitive steel after delivery in order to cold form such steel after storage and to subsequently bake harden the cold formed product made from the steel without the danger of losing the steel's properties as result of ageing.

Instead, as proven by the teaching of Nakaoka, the skilled artisan tried to establish methods of producing age-resistant steels characterized by a good formability and a good work-hardenability. Thus, the known art offers possibilities of avoiding the problem of

ageing, but the price for these solutions is a loss of the superior press formability of bake-hardenable steels of the kind processed according to the present invention.

In conclusion, Nakaoka teaches that at the priority date of the present application a man skilled in the art tried to produce age-resistant steels with good press formability and good work-hardenability. Due to this work-hardenability in combination with the good press formability the know ageing-resistant steels could be cold formed into products which after cold forming have a high toughness. The toughness of the product is achieved by the hardening of the steel as the result of the cold forming. Enameling the product made from the steel produced according to the process disclosed in Nakaoka will not lead to an increased hardness of the product, because the steels processed according to Nakaoka do not have bake-hardening properties.

On the contrary, the presently claimed invention teaches a process with age-sensitive steels with high bake-hardening potential as claimed in claims 1 and 3. These steels do not receive their hardness during cold forming but only during a subsequent heat treatment, which is performed to stove-finish the lacquering applied on the surface of the cold formed

For all of the above reasons, not only the process steps of claims 1, 2 and 4, but also the products of the inventive method as claimed in claims 3 and 5 are different from the method disclosed in Nakaoka.

Thus, the cited prior art, alone or in combination, fails to teach or suggest all the claim limitations as properly required for establishing a *prima facie* case of obviousness. It would therefore not have been obvious for a person skilled in the art at the time of the invention to modify the teachings of Nakaoka to arrive at the presently claimed invention.

Accordingly, a reversal of the rejection of claims 1-5 under 35 U.S.C. 103(a) is respectfully requested.

IX. CONCLUSION

It is respectfully submitted that claims 1 and 3-5, as amended in the Supplemental Amendment after Final Action under 37 C.F.R. 1.116(b), and claim 2 overcome the rejection under 35 U.S.C. 112, second paragraph. It is therefore requested that the rejection under 35 U.S.C. 112, second paragraphs, of claims 1-5 be reversed.

In addition, for the reasons set forth above, it is submitted that claim 1 is not rendered unpatentable by the prior art of record. Furthermore, as claims 2 and 4 depend from claim 1, it is submitted that they too are not rendered unpatentable by the prior art of record.

Also for the reasons set forth above, it is submitted that claim 3 is not rendered unpatentable by the prior art of record, regardless of the patentability of claim 1. Furthermore, as claim 5 depends from claim 3, it is submitted that it too is not rendered unpatentable by the prior art of record.

It is requested that the rejections under 35 U.S.C. 103(a) of claims 1-5 be reversed.

The Commissioner is also hereby authorized to charge a three month Extension of Time Fee from Deposit Account No. 16-2500 of the undersigned.

Respectfully submitted,
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Enclosure: Appendix of Claims in Appeal

X. APPENDIX

--1. A process for the production of a buckling resistant stove-finished structural component from a cold strip which comprises ageing-sensitive steel with a high bake-hardening potential, comprising the steps of:

- converting the cold strip by temper rolling to a yield point elongation-free state in which the condition $R_{eh} - R_{el} < 2$ N/mm^2 is met,
- storing the cold strip at storage temperature below room temperature for a storage period whose length is at most equal to the length of the period at whose end the value of critical ageing is reached which results in dependence on the particular storage temperature,
- cold working the cold strip to give a structural component, and
- stove-finishing the structural component.

2. A process according to claim 1, characterized in that the storage temperature T in [K] of the cold strip is selected in dependence on the planned storage time t in [h] in accordance with the equation

$$T = 9225 / (31.48 - \ln (48/t))$$

with T: storage temperature in [K]

T: storage time in [h].

3. A process for the production of a buckling-resistant stove-finished structural component from a cold strip which comprises ageing-sensitive steel with a high bake-hardening potential, comprising the steps of:

- storing the cold strip undressed for a storage period at room temperature,
- converting the cold strip by temper rolling to a state in which the condition $R_{eh} - R_{el} < 2$ N/mm^2 is met,
- cold working the temper rolled cold strip to give a structural component, and
- stove-finishing the structural component.

4. The process according to claim 1 wherein said bake-hardening potential is at least 70 N/mm^2.

5. The process according to claim 3 wherein said bake-hardening potential is at least 70 N/mm^2.--